

REMARKS

This case has been carefully reviewed and analyzed in view of the Official Action dated 13 May 2002. The undersigned attorney would like to take this opportunity to thank the Examiner for the courtesies extended during a personal interview held on 13 June 2002. Responsive to the rejections made in the Official Action and the discussions held at the interview, Claim 1 has been amended to clarify the combination of elements which form the invention of the subject Patent Application.

In the Official Action, the Examiner objected to the drawings under 37 C.F.R. § 1.83(a). The Examiner stated that the drawings must show every feature of the invention specified in the claims, and therefore, the primary element and the expanding area must be shown or the features cancelled from the claims.

Accordingly, the term "primary element" has been cancelled from the claims, and it is proposed to add the delineation of the expanding area, reference numeral "23" to the drawings. The embodiment of FIGS. 9A and 9B is a variation of the embodiment of FIG. 1, wherein the closed loop defines a looped contour having bends along both vertical and horizontal planes and the heat absorbing source is disclosed within a computer, as described in the Specification, page 10, beginning on line 13. FIG. 1 clearly shows the inclusion of the expanding area. Thus, no new matter is added by this proposed drawing change.

In the Official Action, the Examiner rejected Claims 1, 8, 33-37 and 40 under 35 U.S.C. § 112. as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner indicated a plurality of claim errors with regard to the antecedent basis of a number of terms and recitations which were grammatically incorrect.

Claim 1 has been amended to correct those language deficiencies kindly noted by the Examiner. It is now believed that the claims particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

In the Official Action, the Examiner rejected Claim 1 under 35 U.S.C. § 103 as being unpatentable over Okayasu, U.S. Patent 4,625,790, in view of Larson et al., U.S. Patent 5,704,416. The Examiner stated that the Okayasu reference discloses all the claimed features of the invention with the exception of the loop cooling an electronic device within a computer. The Examiner then referred to the Larson et al. reference as disclosing that it is known to heat a loop heat pipe cooling an electronic device within a computer for the purpose of compactly cooling a desired electronic device within a personal computer, as disclosed in Larson et al.

It is respectfully submitted that the Okayasu reference is directed to a heat transport apparatus that comprises a closed loop including a heating block and a radiator having a pulsatile fluid flow. The heating block is provided with a recess for producing a small bubble that is grown by heating the heating block. The bubble grows by virtue of

the temperature of the heating block exceeding the saturation temperature of the working fluid vapor and the internal pressure in the bubble seed. The working fluid evaporates towards the bubble at the interface between the working fluid and the bubble, causing the bubble to grow. The increase in the size of the bubble causes a corresponding increase in pressure in the pipe G_1 and G_2 . Responsive to the pressure change, the check valve CV_1 closes and the check valve CV_2 opens. The continually growing bubble causes the working fluid to flow past the valve CV_2 into the accumulator H. The surface area of the bubble increases as it grows on the side of the pipe G_2 , but growth of the bubble stops when the amount of evaporation of the working fluid at the heating block becomes identical to the amount of condensation of vapor on the increased surface area of the bubble. As the bubble grew, the working fluid was displaced from the G_2 into the accumulator H, the increased volume of the fluid causing the flexible bellows of the accumulator to expand outwardly.

With the bubble growth stopped, the amount of condensation of vapor comes to exceed the amount of evaporation, and the bubble thus begins to contract. Under these conditions, the pressure in the bubble becomes less than that in the accumulator and the check valve CV_2 closes, while the check valve CV_1 opens. Along with the change in the check valves, the bellows constricts to cause the working fluid to flow from the accumulator through the pipe M_1 , the radiator EX, the pipe M_2 and the check valve CV_1 into the pipe G_1 , and forcing the working fluid into the heating block B. The heating

block B is thus cooled by the working fluid flowing thereinto, to further constrict the bubble and cause a negative pressure with which the working fluid is drawn from the accumulator through the radiator and through the heating block. This flow of cooled working fluid causes the bubble to momentarily disappear, allowing the cycle to be repeated. Col. 2, line 61 through Col. 3, line 53.

Thus, the flow of working fluid within Okayasu is pulsatile, with the bellows of the accumulator being utilized to pump the working fluid from the accumulator during one portion of the cycle. The accumulator is in line with the flow path and by virtue of its expanded volume increases the flow resistance to the working fluid, as do the check valves CV₁ and CV₂.

Whereas in the invention of the subject Patent Application, the bubble generator continuously generates a plurality of bubbles which are guided within the guide region to flow through the loop, the loop defining a looped contour having bends along both vertical and horizontal planes. The expanded vapor which forms the bubbles in the invention of the subject Patent Application is collected in the expanding area. In contradistinction, the bubbles of the referenced system never leave the area between the two check valves, and there is no disclosure or suggestion of providing a loop wherein the looped contour has bends along both vertical and horizontal planes.

The Larson et al. reference does not overcome the deficiencies of Okayasu. The Larson et al. reference is directed to a two phase component cooler for cooling electronic

devices. However, nowhere does the reference disclose or suggest the inclusion of an expanding area or a loop which defines a loop contour having bends in both vertical and horizontal planes, as now claimed.

Therefore, the combination of Okayasu and Larson et al. cannot make obvious the invention of the subject Patent Application, as now claimed. The other references relied upon by the Examiner for combination with Okayasu and Larson et al. to make obvious other features of the invention of the subject Patent Application, do not overcome the deficiencies of Okayasu and Larson. Thus, in combination those references cannot make obvious the invention of the subject Patent Application, as now claimed. Further, the claims dependent on the now amended Claim 1, are believed to be dependent upon an allowable base claim and therefore allowable for at least the same reasons.

It is now believed that the subject Patent Application has been placed in condition for allowance and such action is respectfully requested.

Respectfully submitted,



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